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ABSTRACT

With the Internet taking a dominant role in corporate training, education, retail, and customer based product exploration, authors of Web-based information need to ensure that the media they deliver is accessible to the widest possible audience. Whether users have a visual, auditory, physical, or developmental disability, accessible multimedia can enhance and promote the message delivery through the chosen medium. This paper outlines some of the multimedia technologies currently available on the Web and the means to make them more accessible. It discusses Web audio and video captioning in Realmedia, Windows media, and QuickTime; Macromedia Flash, one of the fastest growing Web media formats; PowerPoint for the Web and four techniques that can be used to render PowerPoint information accessible to those with disabilities; Scalable Vector Graphics (SVG), an XML based language that allows images, text and vector graphics to be programmed directly into the Web interface; and Portable Document Format (PDF), which has become a standard protocol for the distribution of electronic documents via the Web. (Contains 20 references.) (AEF)

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Accessible Multimedia for the Web

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Introduction

The World Wide Web has evolved from a primary text based medium into an integrated net of media. With this change comes the responsibility of the author to ensure that all aspects of the communication on their site are accessible. This communication whether by video, audio, or animation, in its ability to relay information to the audience, is something that should not be discriminate in its delivery.

With the Internet taking a dominant role in corporate training, education, retail, and customer based product exploration; all have to ensure that the media they do deliver is accessible to the widest audience. The technologies capability to enhance, promote, and engage the customer or the learning experience, contributes to the success of the author's intended message. The audience includes those with disabilities.

Whether users have a visual, auditory, physical, or developmental disability, accessible multimedia can enhance and promote the message delivery through the chosen medium. Current Web multimedia technologies of use on the Internet are enhanced and made accessible with some simple modifications and alterations. This paper outlines some of the multimedia technologies currently available on the Web and the means to make them more accessible.

Web Audio and Video Captioning

Captioning is synchronized text that is used as an alternative format to deliver audio content (WGBH, 1992). The goal for multimedia authors should be to provide captions for all audio, including that contained in video and animations. Typically, captions are displayed through a client-side media player.

Designed by the WGBH Educational Foundation in Boston, a public broadcasting company, captioning was originally designed for people who are deaf or hard of hearing (Microsoft, 2002). Like other enabling technologies, captioning and its ability to relay information, can now be seen as an asset to those without hearing difficulties. It's applications for those wanting to learn a second language, learning to read, communication in noisy environments, and people using equipment with poor audio quality, showcases the delivery formats wide application base (Microsoft, 2002). This application base can now be delivered on the Web.

The ability to transfer this alternative audio format for Web based audio and video allows everyone the ability to learn and accept the message of the page author. Through the work of the World Wide Web Consortium (W3C) Synchronized Multimedia Integration Language (SMIL) and various media player contributors, captioning on the Web is a reality (W3C, 1998).

Captioning audio and video in Realmedia. Incorporating closed and open captioning in real player is achieved in several ways. Real Networks, being one of the first organizations to capitalize on the benefits and potential of SMIL and XML, has created their own subset language called RealText (RealNetworks, 2000). RealText is a mark-up language similar to HTML and can be programmed using any standard text

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editor. This language, which is fully supported through the Realmedia player, allows multimedia developers to incorporate synchronized text, audio, and video without taking away user control. Since the text caption is a separate file within the media presentation, the captioning can be turned on an off by the users and is readily edited.

Captioning audio and video in Windows Media format. Not unlike Real Networks Real media, Microsoft's Windows media will also support SMIL functionality. Through their own XML subset language called SAMI, which stands for Synchronized Accessible Multimedia Interchange, Windows Media player and Encarta products can interpret and playback captions in up to 8 different languages (Microsoft, 2001). SAMI is written in a plain text editor and saved in the same directory as the Windows Media file. Through the Windows Media player closed captions can be turned on an off by the users and edited easily apart from the other media files.

Captioning audio and video in QuickTime. Apple's QuickTime player also supports captioning through the use of QuickTime Text. QuickTime Text is a simple tag-based syntax that reads in text captions and synchronizes them to an audio or video file (Apple, 2002). The text is then imported as a separate track embedded in the QuickTime movie. Closed captioning can be enabled and disabled by turning text tracks on or off, or by incorporating interactive QuickTime elements through software such as Livestage (Totally Hip, 2002) or SimpleCaption (Baird, 2002).

The authoring tools that are available to caption these media elements can be as simplistic as a simple text editor to the multifaceted functionality of Livestage. One tool that allows the author to caption video and audio and save the caption text file in all supported above formats, namely SMIL, SAMI, and QuickTime Text, is MAGpie. MAGpie, or the Media Access Generator, which was created by the National Center for Accessible Media (NCAM), allows authors to create captions for Web based audio and video (NCAM, 1996). This tool is free and available for Macintosh and Windows based computers.

Macromedia Flash

Flash is one of the fastest growing Web media formats. It's ability to supply small file sizes, interactivity, and its scalability has made it a very attractive media element to incorporate into a Website. The problem with this media format, like other Web browser plug-in formats, is that they are not readily accessible to assistive technology. The interactive elements, text and animations that are contained in the media leave the user unable to navigate or access the information within. These problems, however, have been addressed as an add-on extension for Flash 5 and in Flash MX (Macromedia, 2002).

With Flash MX and the Flash 6 Web browser plug-in, developers can now add descriptive text to Flash based animations, forms, movies, and content that is readily accessible to operating system and application-based screen readers (Macromedia, 2002). Macromedia's support for accessibility also extends through the use of the Microsoft Active Accessibility Application Programming Interface (API), which enables the software program to expose information about their content and user interface to assertive technologies (Macromedia, 2002). This is utilized by the application and it's Web plug-in. Some of the specific accessible elements that are incorporated into Flash are (Macromedia, 2002):

- Text based descriptions of Flash elements, which can be read by a screen reader application for those with visual impairments.
- Scalable vector text and graphics, which can be magnified without a loss of quality, for those with visual and auditory impairments.
- Content controls that allow the user to control the playback of content
- Customized colour control for those with colour blindness.
- The ability to synchronize audio with visual elements.
- Mouse free navigation controls
- An Accessibility window in Flash MX to help in accessible Flash creation.

The ability to provide accessible Flash content can also be utilized in previous versions of Flash through the use of the Flash 6 browser plug-in. These older versions of the technology enable the author to utilize long description tags, alt tags, and alternative text for the published movie as long as the audience is using an appropriate screen readers that support Flash (Clark, 2002).

PowerPoint for the Web

Using presentation media presents a challenge to users who are blind, deaf or hard of hearing. More often than not the audio is unusable or the presentation itself is not readable by screen readers (WebAIM, 2002B). There are several techniques that can be used to assist these users in accessing the meaning of media content. These techniques mainly involve creating text equivalents for the graphical data and also creating accessible HTML versions. The four techniques below can all be used to render PowerPoint information accessible to those with disabilities.

Provide the Source File. Probably the best and easiest way for you to ensure that your presentation can be viewed is to provide the users with the source file or the actual PowerPoint file (WebAIM, 2002A). Microsoft has improved its accessibility options within Office 2000 and Office XP and information within the documents outline and description text can be accessed with Office compliant assistive technology.

Saving the Outline Only. You can also save the outline of your PowerPoint presentation as text or rich text and convert that outline to Accessible HTML. With this method you don't get the added benefit of visuals - so if visuals are important to your presentation then you may not want to use this technique (WebAIM, 2002A).

Using the Save as Accessible Plug in. This Power Point Point Accessibility Wizard, which is available free from the Division of Rehabilitation Education Services at University of Illinois, simplifies the task of converting PowerPoint presentations to pure HTML through an easy- to-use user interface (Gunderson, 2002). This plug in converts Power Point Presentations to an HTML format that includes required accessibility information including ALT tags and accessible formatting. Although this tool is still in BETA form it one of the easiest tools to use to make PowerPoint presentations accessible (WEBAIM, 2002A).

Convert Presentations to Video Format. Creating accessible presentation media using Windows Media, QuickTime or Real Media involves captioning or adding audio descriptions. Those with disabilities can then access this extra information contained within the presentation. Conversion of PowerPoint to any of the aforementioned video formats can be accomplished with a variety of tools. Some of the tools available include Real Presenter for Real Media, Microsoft Producer for Windows Media, and QuickTime Pro. Captioning these presentations can then be accomplished using MAGPie (NCAM, 2002), Hi-Caption (HiSoftware, 2002), SAMI (Microsoft, 2002), SMIL (W3C, 1998), RealText (RealNetworks, 2000) or QuickTime Text (Apple, 2002).

Scalable Vector Graphics (SVG)

SVG is an XML (Extensible Mark-up Language) based language that allows images, text and vector graphics to be programmed directly into the Web interface (W3C, 2002). This language allows for the description of two-dimensional objects that can be scaled and manipulated with no loss in resolution of the object. With it's ability to be incorporated directly into the XML coding of the page text equivalents for images, and other descriptive features in the media can be accessed by those who use assistive technologies (W3C, 2002).

Other attributes of this graphics format language is its ability for interactivity, data driven content, and alternative delivery modes and structures for content. This includes directory structures for image equivalents and language alternatives (Adobe, 2002).

Portable Document Format (PDF)

Adobe Portable Document Format (PDF) has become a standard protocol for the distribution of electronic documents via the Web. It's ability to retain the original source documents formatting, fonts, colors, and graphics, regardless of what application platform it was created on, outlines its power on the Web (Adobe, 2002). With the introduction of Acrobat 5.0 and the updated Acrobat reader plug-in, Adobe has included accessibility enhancements to the Portable Document format (PDF) making a very viable option for the distribution of accessible information. With the ability to add tagged information to PDF documents, screen readers can now access PDF text content, logical document structure, and alternative text information for images and graphics (Adobe, 2002). These enhancements allow the reader to follow the intended document organization and reading order while navigating the document.

With accessible PDF documents users can now:

- Follow the logical reading order of the document. This is achieved by defining the structure of the document by using tiles, chapters, headings, and multicoloured text.
- Provide alternative text descriptions for images
- Navigate with embedded links
- Specify document languages to benefit screen readers that may be able to change languages the fly.
- Use windows based screen readers to read the text
- Use keyboard navigation.
- View documents in high contrast mode.
- Zoom in on text and reflow to fit any size view when working with tagged (accessible) Adobe PDF files.

Conclusion

With the use of any Web based information the author is ultimately responsible to ensure that the message is accessible. This includes information that is contained within multimedia. Although these media do possess barriers to those with disabilities through their delivery, alternative delivery methods can ensure that the widest audience receives the message. Various methods, tools and protocols that are currently available, and others in development, can facilitate the creation of these media. These tools however, can only be utilized by those whom are aware of accessibility issues. Through the conscience effort of all that contribute to the World Wide Web, all information can be made accessible.

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